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# GEOGRAPHICAL RECORD

## AMERICAN GEOGRAPHICAL SOCIETY

**The General and Technical Meetings.** On December 14th at 8:30 P. M. Baron de Geer addressed the Society on the subject of "Geochronology and its Application to Physical Geography." It was the first of a series of special lectures to be given during the winter season at the Society's building, Broadway at 156th Street. These lectures will be of a more technical nature, affording opportunity for the exhibition of appropriate illustrative material and taking the place of the former intermonthly meetings held at the Engineering Societies' Building, 29 West 39th Street. The regular monthly meetings of the Society will be held as usual in the auditorium of the Engineering Societies' Building and will retain their character of general interest.

Mr. Roy C. Andrews, of the American Museum of Natural History, opened the lecture program for the year on November 23, 1920. On December 21 Dr. Alexander Hamilton Rice gave the second lecture. In January the Society will hear Mr. Robert Cushman Murphy, of the Brooklyn Museum. His lecture is entitled "The Humboldt Current and the Islands of Peru." In February Professor Robert F. Griggs, of Ohio State University, will deliver an illustrated lecture on Katmai Volcano, Alaska. Announcement will be made at a later time of the remaining lectures to be given in March and April.

**Address by Baron Gerard de Geer on Post-Glacial Chronology.** Baron Gerard de Geer is Professor of Geology at the University of Stockholm. He has just concluded a visit to North America for the purpose of supplementing his extensive studies of Scandinavia and Spitsbergen in the field of post-glacial chronology. By a detailed study of the laminae of clay beds deposited in fresh water, Professor de Geer was able to discover seasonal effects, so that he could count the years during which the deposit had been made. Thus by a careful selection of localities and by matching variations in widely separated deposits, he was able to piece together the post-glacial record, including the retreatal stages of the ice sheet in Scandinavia. Professor de Geer then carried his studies into Spitsbergen, where they took on a somewhat different form; and with the help of an assistant he has studied deposits in northeastern North America in an effort to correlate the chief historical events of the late-glacial and post-glacial epochs with the events of similar epochs in Scandinavia.

The results are in every way gratifying. The correspondences are quite convincing, and there is thus held out the prospect that a more detailed and far more reliable chronology than existed hitherto may be worked out. Not the least interesting of Baron de Geer's observations was the one dealing with the possibility of correlating the latter part of the clay record with the earlier part of the tree record discovered by Professor Douglass and later worked out in great detail by Professor Huntington in Carnegie Institution Publication No. 192. It would be an extremely interesting thing to match the clay record of a recent period with the record of the rings of growth of the trees of the latest period, thus providing a complete chronology from late glacial times right into the present. This introduction of the time factor has a wide application in the field of physical geography. Where the recession of the former ice sheet has been determined the rate of evolutionary processes can be established. For instance it has been shown that in central Scandinavia the land has been uplifted some 900 feet in the last 8,500 years at a decreasing rate that has been determined century by century. At the same time the changes in the rate of melting of the ice afford a most remarkable register of the annual variation in the amount of heat received from the sun, thus extending the field of investigation of climatic evolution from terrestrial to astrophysical causes.

**Presentation of the David Livingstone Centenary Medal to Dr. Alexander Hamilton Rice and Lecture by Dr. Rice.** Dr. Rice's lecture dealt with his latest journey up the Rio Negro, through the Casiquiare Canal, and the upper waters of the Orinoco. Before the lecture Dr. Rice was presented the David Livingstone Centenary Medal, founded by the Hispanic Society of America and awarded by the American Geographical Society. Dr. Rice is the sixth recipient of the medal, the earlier recipients being Sir Douglas Mawson, Theodore Roosevelt, Manuel Vicente Ballivián, Candido Mariano da Silva Rondon, and William Speirs Bruce. In presenting the medal President Greenough spoke as follows:

"It is now my pleasing duty as your President to bestow your gold medal upon a most worthy recipient. The resolution of award by the Council reads as follows:

TO
ALEXANDER HAMILTON RICE
1920

> Specially equipped for pioneer work in exploration he chose for his field various tributaries of the Amazon, hitherto unknown. In six successive journeys he surveyed large portions of the Rio Negro; the Solimões, the Uaupes, the Içana, and Iniridi, the Casiquiare Canal, and the Upper Orinoco. He has also maintained a school at São Gabriel for the education of the natives and devoted himself to a fundamental understanding of the life of northwestern Amazonas.

"This brief text serves as an index to the extensive and valuable services which the explorer has rendered to geographical science. When we realize that the Amazon Valley has 30,000 miles of navigable waterway, we can appreciate that many of these are still a sealed book to civilized mankind. Our guest has not only defined the great watercourses of the unknown regions which he visited, but he has investigated thoroughly the adjacent country, its topography, and its native population. The perils of such adventures are illustrated in the case of our lamented colleague the late Colonel Roosevelt, whose life was undoubtedly shortened by illness contracted in his journey down one of the tributaries of the great river.

"All the data acquired on his expeditions have been reduced by Dr. Rice to complete scientific order and record, thus rendering them available for further research; and he has pursued his important work with modest devotion to his quest, free from any public exploitation or advertisement. Such a bearing adds to the satisfaction which the Society may well feel in according suitable recognition to a notable accomplishment.

"And now, Sir, on behalf of the Society I ask your acceptance of this memorial of your distinguished efforts in the past, accompanied by the good wishes of all our Fellows for your welfare and success in your future undertakings."

After explaining his methods of survey in northwestern Amazonas, where he has explored a large region during the past thirteen years, Dr. Rice described the difficulties of the journey up the headwaters of the Rio Negro to the Casiquiare Canal, illustrating his description with many slides depicting the life of the natives. After a description of the Canal, which connects the headwaters of the Rio Negro and the Orinoco, Dr. Rice came to the climax of his account—the attack by savages upon his camp on the Orinoco east of the Canal. He was obliged to keep up a running fight with them for some hours and was lucky enough to escape with his life. The incident required him to leave incomplete a part of the original program.

## NORTH AMERICA

**The Population of Porto Rico.** A preliminary bulletin issued by the Fourteenth Census (1920) shows that the total population of Porto Rico has increased from 1,118,012 in 1910 to 1,297,772 in 1920 or at a rate (16.1 per cent) corresponding very closely to the rate for the preceding decade. Though on the whole this increase has progressed with fair uniformity throughout the larger part of the island, it is more noticeable in the area lying south of and tributary to San Juan than elsewhere. The density of population is 325.5 per square mile, the equivalent of that of a large portion of the Po valley. If the present rate of increase keeps up, the problem of over-population is likely to become even more and more serious in the future. (F. K. Fleagle: Social Problems in Porto Rico, 1917.)

Visitors have often observed that the population is distributed with remarkable evenness over almost the entire surface of the island. Except for San Juan with 70,707 inhabitants and Ponce with 41,561, there are no towns of over 20,000 and the majority of the people dwell in the open country. Only 21.8 per cent live in towns or villages of more than 2,500, and 73.5 per cent live in rural districts not a part of any village. Nor has there been any appreciable displacement of the people from country to town. Between 1899 and 1910, probably as an immediate result of the American occupation, the proportion of town to country dwellers rose from 14.6 per cent to 20.1 per cent, or 5.5 per cent of the total; but in the last decade urban centers of over 2,500 gained only 2 per cent.

## SOUTH AMERICA

**The Patagonian Forests.** The Patagonian forests extending from latitude 33° S. (in the coastal mountains of Chile) to latitude 55° S. (Cape Horn), a distance of some 1,500 miles, form the subject of a report published by the Argentine Ministry of Agriculture (Max. Rothkugel: Los Bosques Patagonicos, Buenos Aires, 1916).

This long but narrow region is divided into three subregions: (1) Humid (rain) forests with many species, (2) humid (rain) forests with few species, (3) pure forests to the east and north of the humid forests.

The humid forests with many species extend from latitude 38° S. (near Victoria, Chile) to latitude 48° S. (mouth of Rio Baker). The region has a rainfall of between 80 and 120 inches and lies west of the axis of the Andes mostly on the Chilean side, though, mainly because the boundary line between Chile and Argentina does not coincide with the watershed, patches of the forests extend into Argentina. While the climate of this region varies according to latitude and altitude, it is generally mild with little or no snow or frost on the coast and with a fairly equable temperature throughout the year. At higher altitudes, where the forest occurs in the valleys, the climate is of course more severe. Nevertheless the conditions are such that the forest consists of a mixture of many species with an undergrowth that suggests subtropical rather than "antarctic" conditions, as is suggested by the designation often applied to the floral region of the Patagonian forests (Griesbach). Indeed one author, Warming, classified it as "subtropical," and Schimper calls it a "temperate rain forest." The principal trees of the region are the evergreen beeches (*Nothofagus*) and certain conifers (*Libocedrus*, *Fitzroya*, *Podocarpus*, and *Saxegothea*). The principal commercial timbers are *roble* (*Nothofagus obliqua*), *rauli* (*Nothofagus procera*), *coihue* (*Nothofagus Dombeyi*), *cipres* (*Libocedrus chilensis*), *alerce* (*Fitzroya patagonica*), and others.

The northern part of the forest region in Chile has been mostly cut over by the lumbermen and for agricultural purposes.

The humid forests with few species lie from south latitude 48° to Cape Horn. This region has a colder climate than the region to the north, with generally the same rainfall conditions. The index species of this region is *guindo* (*Nothofagus betuloides*) mixed with others, though the composition of the forest is not so complex. It has undergrowth species.

The pure forests extend in a narrow belt mostly on the Argentina side from Tierra del Fuego to the northern part of the territory of Neuquén, a distance of 1,100 miles. Here the characteristic species are *lengue* (*Nothofagus pumila*) and *ñire* (*Nothofagus antarctica*), usually occurring in almost pure stands. In Chile the region continues north of the humid region in the high valleys of the Andes, to 35° S. latitude and in the coastal mountains to 33° S. latitude. Besides *ñire* and *lengue* these forests contain roble. The pure forests are the expression of a drier climate and grade off into the non-forested regions of the east and north. In Argentina at the south they are found from sea level to 2,000 feet altitude and at the north from 4,000 to 6,000 feet altitude.

The subregion of the Chilean pine (*Araucaria imbricata*), known in Argentina as *pino de Neuquén*, lies in the Andes well to the north, from near 37° S. latitude to about 40° S. latitude, with a detached area in the Nahualbuta section of the coastal mountains of Chile between 37° and 38° S. latitude. There are two types of this; one pure, lying mostly on the Argentina side, and one mixed with other species, mostly in Chile. In Argentina the altitudinal range of the Chilean pine is from 2,100 feet above sea level at 40° S. latitude to about 6,000 feet at 37° S. latitude. The Argentina portion of the Araucarian forest covers some 200,000 acres, and is very inaccessible at the present time.

The Patagonian forest area of Argentina (with which the report is primarily concerned), covering nearly 10,000 square miles of intact forest, has no commercial value at present. But the forest is highly important as a protective cover. As Bailey Willis (Northern Patagonia) has shown, some of the adjacent semidesert land is susceptible of irrigation with the proper protection of the forested watersheds. If properly managed it would do this and be able to furnish continuous crops of timber for the inhabitants of the country. Steps have been taken by the Argentine government for the protection of the forests, and the introduction of economically valuable species of trees is being considered.

H. N. Whitford

## EUROPE

**The Italian-Yugo-Slav Boundary and the Free State of Fiume.** The treaty of Rapallo (Rapallo is a few miles east of Genoa) signed November 10 establishes the boundary between Italy and the Serb-Croat-Slovene Kingdom and creates the Free State of Fiume. The text of the treaty is published in *Il Messaggero* for November 13, 1920.

Italy gains practically her maximum demands in the "irredenta" of Julian Venetia (see the review of Tamaro's "La Vénétie Julienne" on p. 153). The treaty of London line has here been the base of further concessions. This line it will be recalled ran from Mt. Tarvis along the watershed (Julian Alps) between the Isonzo and Save basins to the pass of Idria (leaving the famous mercury mines in Italian territory), thence across the forealpine and karst country towards the Schneeberg (Mt. Nevoso) "in such a way as not to include the basin of the Save and its tributaries in Italian territory," thence to the head of the Quarnero west of Fiume. The accompanying map shows the deviations from this line. Italy acquires the town of Tarvis (a strategic point commanding routes northeast to the Drave, west over the Saifnitz (Camporosso) pass to the Tagliamento and south over the Predil pass to the Isonzo. East and south of Idria Italy gains a considerable territory including the town of Adelsberg whereby the frontier is pushed well towards Laibach. From the eastern slopes of the Schneeberg the line swings southwestwards to meet the northern boundary of the Free State of Fiume a short distance southwest of Castua. Of Istrian territory Italy also acquires the islands of Cherzo and Lussin and the small islands and rocks included in their judicial districts.

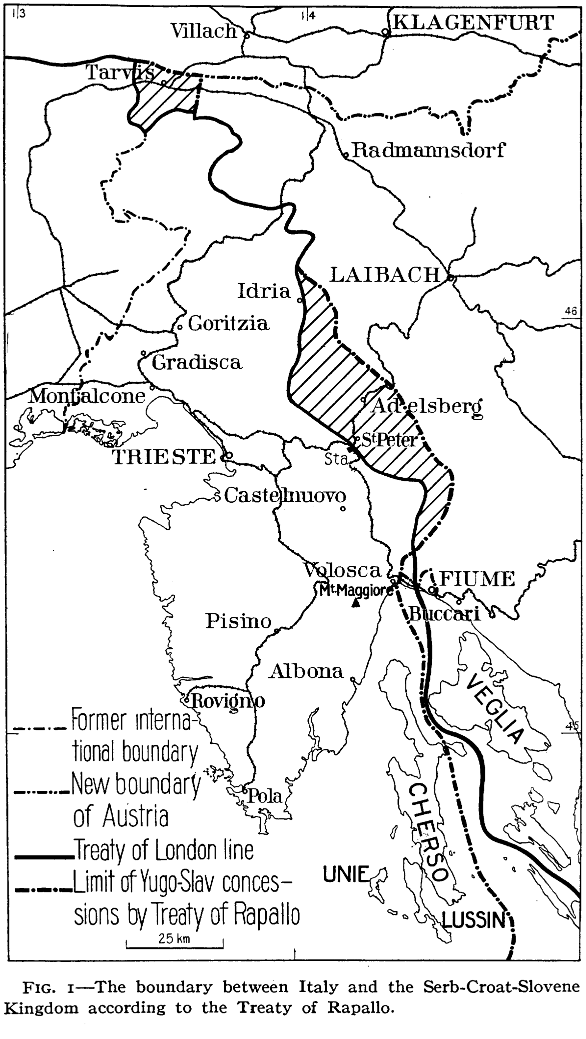

FIG. 1—The boundary between Italy and the Serb-Croat-Slovene Kingdom according to the Treaty of Rapallo.

Italian sovereignty in Dalmatia is limited to a territory about Zara including the city and the fiscal commune, the adjoining fiscal communes of Borgo Erizzo, Cerno, Boccagnazzo and a part of Diclo. Special arrangements will be made to provide for reciprocal relations between this territory and the rest of the territory formerly belonging to the "commune, district and province." This will include equal division of the provincial and communal property and archives.

The islands of Lagosta and Pelagosa with the adjacent islets go to Italy. All the other Dalmatian islands are recognized as forming part of the Serb-Croat-Slovene Kingdom.

The State of Fiume is recognized as independent. It comprises the "corpus separatum" delimited by the boundaries of the city and district of Fiume and a strip of former Istrian territory along the Gulf of Fiume. This strip which averages a kilometer and a half in width provides an unbroken route from the free city to contiguous Italian territory, one of the prime conditions of the Italian diplomatic program ever since the summer of 1919.

**Natural Political Divisions of the Scandinavian Countries.** The general tendency to reconstruction, resulting from the war, has found an expression in many of the European countries in the desire for internal political and economic readjustment. In the *Geographical Review*, Vol. 7, 1919, pp. 114–118, various proposals for changing existing administrative subdivisions, notably those of England, France, and Germany, were discussed. In line with this general tendency is Professor Sten de Geer's suggestion, developed in an article in *Ymer*, which contemplates the redistribution of the subdivisions of Fenno-Scandia and Denmark in general and of Sweden in detail.

The proposed plan reduces to eight the present twenty-five provinces of Sweden. The proposed provinces are founded upon geomorphological, hydrographic, and climatic bases with due regard for biogeographic and anthropogeographic factors, a consideration of their historical development and the groupings of population. They are units of production, transportation, and commerce; and as a rule they have about equal population. That the boundaries of these provinces cannot conform to all factors is evident, but the transgressions of any one determining factor upon another are remarkably few and relatively insignificant.

By Professor de Geer's proposed division, Öfvernorrland and Nedernorrland comprise the northern and southern halves of the northern third of Sweden; Bergslagen and Mälarelandet, the western and eastern halves of central Sweden; Västkustlandet, Östkustlandet, and Skåne, comprise the southern portion; and Gottland becomes a distinct island province despite the rather close relation to the neighboring mainland.

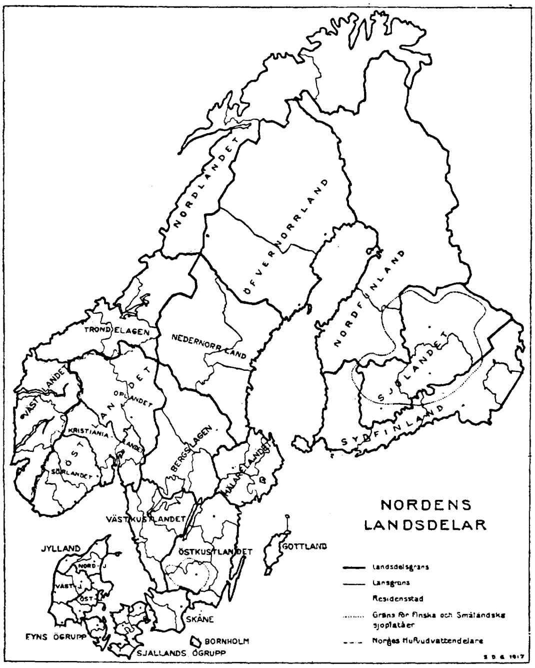

FIG. 1—Proposed political divisions of the Scandinavian countries. Reproduced from the article abstracted in the text.

The five southern provinces are fundamentally based upon distinct geomorphological characteristics. The three northern provinces are comprised within the sharply defined physiographic unit, Norrland, which is geomorphologically and biogeographically a distinct area. The southern boundary of Norrland is the northern limit of the oak, fruit trees, and pure agriculture; it is the southern limit of heavy snow, arctic winter, and lumbering. Delimitation of the provinces is largely determined by the watersheds.

The provinces thus defined are readily adaptable to the needs of administrative control. In this connection De Geer discusses them in relation to judicial, ecclesiastic, and military government, and argues for the relatively slight changes which his proposed system would necessitate. Though these changes would benefit both the judiciary and the church somewhat, it is the military strength of the nation which would best be served and promoted, particularly if the man power of each new province be duly considered. The final argument for the proposed subdivisions is based upon economic factors. The postal service, the railway systems, and movements of trade accord well with the new system.

The possibilities for the establishment of like rational provinces in the neighboring Scandinavian countries are briefly discussed. In Norway such a subdivision is readily established and easily justified. Norway is subdivided into the six provinces; Nordlandet, Tröndelagen, Västlandet, and the three districts—Oplandet, Kristianialandet, and Sörlandet—of Östlandet. Of these the three first named front upon the Atlantic and are definite natural divisions. They vary considerably in population but yet not so much so that serious objection may be raised on this ground. The three districts of Östlandet are a natural gemorphological unit, but because if united they contain over half the population of Norway, their retention as subdivisions is considered desirable.

These subdivisions of Norway accord very well with those proposed for Sweden: Nordlandet corresponds to Öfvernorrland naturally and culturally; the southern boundary of one is a continuation of the southern boundary of the other. The two provinces are connected by railway from Luleå to Narvik. Similarly, Trondelagan corresponds to Nedernorrland. These divisions are connected by railway from Sundsvall, in Nedernorrland, to Trondjhem. Oplandet in Norway corresponds to Bergslagen in Sweden. These two provinces lack seacoast, the only provinces in Scandinavia which do not front salt water. Further correspondence between the subdivisions of the two countries may be found in Kristianialandet and Sörlandet to Västkustlandet, and in Västlandet to Östkustlandet. These southern provinces are connected by railway and are industrially analogous.

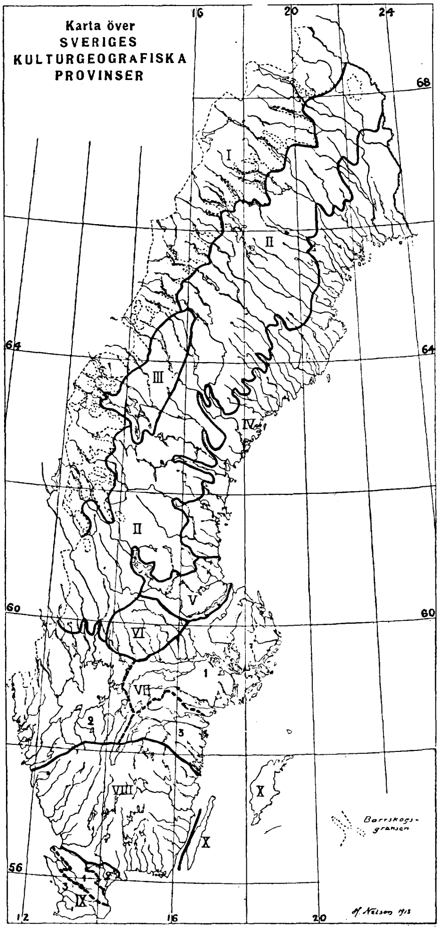

FIG. 1—Proposed geographic regions of Sweden. Reproduced from the article abstracted in the text.

Finland is divided into Nordfinland, similar to the northern provinces of Norway and Sweden; Sydfinland, roughly accordant with the southern provinces of the peninsula; and an inland province, Sjölandet, the great lake district of Finland, which may be compared with the lake district of Sweden, though the latter is not defined as a province.

Denmark must be subdivided on the basis of factors quite different from those considered in the rest of Scandinavia. Two principal divisions at once suggest themselves—the peninsula Jylland (Jutland) and the islands. Jylland may tentatively be divided into three natural divisions, Väst-Jylland, Nord-Jylland, and Öst-Jylland distinguished by different soils and different culture and comparing favorably as regards population; but such a subdivision De Geer considers merely experimental. The islands may again be divided into distinct groups—the Eyn group, the Sjaelland group, and Bornholm.

W. ELMER EKBLAW

**The Geographical Subdivision of Sweden: A Study in Urban Geography.** The proposed subdivision of the Scandinavian countries abstracted above from *Ymer* has provoked further discussion. In the succeeding number of *Ymer* (No. 4, 1918) Dr. Helge Nelson raises the argument that De Geer's standpoint is in reality administrative rather than geographic and that his subdivisions are essentially historical-administrative in character. Dr. Nelson's own proposal is of a more radical nature. His thesis is expounded at greater length in the recent *Festskrift* volume of Lund University (*Lunds Universitets arsskrift*, N.F. Avd. 1, Vol. 14, 1918) in the article "Geografiska studier over de svenska stadernas och stadslika orternas lage," of which a useful summary and review is given by John Frodin in *Geografiska Annaler*, Volume 1, 1919, pp. 400–404.

The primary idea back of the new subdivision is "to define the relationship between man's culture and his environment and to express man's reaction to his habitat and his influence upon his habitat. The basis for such subdivision is to be sought not in the separate natural elements, topography, hydrography, vegetation, etc., nor in an attempted reconciliation of them but in some composite culture factor. The facts of human settlement afford this criterion, more particularly the concentrated grouping—towns and town-like agglomerations. As Jefferson says, "The grouping of these human foci would sketch for us the actual geographic provinces of the earth, not physiographic, not geologic, not climatic, nor yet political, but geographic as showing man on the actual earth in the play of varied forces." In such a view of course the urban unit is considered in relation to the surrounding country. It is regarded as "an organism which has grown out of the landscape to which it belongs as a natural exponent thereof." Furthermore the character of the town is "an expression of different factors which have been at work during the different stages of development."

From this standpoint the author arrives at the subdivision of Sweden into the following geographical regions:

I. The Mountain Region: 65,000 square kilometers with 28,000 inhabitants (0.4 per sq. km.). The single urban center owes its existence to purely local circumstances.

II. The North Swedish Woodland: 138,000 sq. km. with 290,000 inhabitants (2 per sq. km.) of whom 4 per cent live in urban communities.

III. The North Swedish Silurian Region: 13,800 sq. km. with 80,000 inhabitants (5.8 per sq. km.) of whom 17 per cent are urban. The towns are commercial centers. The significance of the calcareous element of the soils of the silurian rocks has frequently been pointed out (see Rabot: La distribution de la population en Suède en fonction de la constitution géologique du sol *La Géographie*, Vol. 11, 1905, pp. 359–367).

IV. The North Swedish Coastal Region: 52,200 sq. km. with 621,000 inhabitants (12 per sq. km.) of whom 19 per cent are urban. There is a line of older towns at the head of river navigation; a group of outposts dependent on the sawmills; a series of industrial and railroad centers.

V. The Gästrikland (South) Dalarne Region: 8,700 sq. km. with 240,000 inhabitants (28 per sq. km.) of whom 40 per cent are urban. The towns are mining and manufacturing centers.

VI. Bergslagen: 8,100 sq. km. with 131,000 inhabitants (15 per sq. km.) of whom 23 per cent are urban.

VII. The Central Swedish Plain and Fault Region: 65,100 sq. km. with 2,506,000 inhabitants (39 per sq. km.) of whom 47 per cent are urban. In subprovince 1, the Mälar country, the ratio of urban (55 per cent) to rural population rises highest. The towns of the eastern coast are typically medieval trading centers at the heads of the bays. On the west they are often fishing centers, while the large lakes have fixed the positions of many towns in this region.

VIII. The South Swedish Uplands: 45,800 sq. km. with 1,060,000 inhabitants (23 per sq. km.) of whom 22 per cent are urban. There are coast towns on good harbors, but no less than 33 of the 45 urban communities are in the interior. Many have come into existence during recent years at points where the railroads intersect old traffic lines.

IX. The Scanian Horst and Plains Region: 9,300 sq. km. with 673,000 inhabitants (72 per sq. km.). Of the population of the Horst only 3.3 per cent is urban. In the southwestern plain the percentage rises to 49; on the Kristianstad plain to 30.

X. The great Baltic Islands, Gottland and Oland. Each possesses one town.

## ASIA

**Climatic Zones of Japan and Formosa.** A zonal classification of the climate of Japan and Formosa is given by Miss E. M. Sanders in the July, 1920, number of the ***Monthly*** *Weather Review*. In Japan proper three major climatic zones are recognized based upon the isotherms for January—northern (north of the 32° F. line), central (between 32° and 40° F.), southern (south of 40° F.). The first two zones are susceptible of division each into two types.

In the northern zone the Nemuro type includes the greater part of the island of Hokkaido. It exhibits an extreme temperature anomaly. The average winter temperature is every-where below 20° F.; the summer temperature ranges between 60° and 70° F. The anomaly is more marked than in the case of Newfoundland with which Hokkaido is commonly compared as regards climate. The rainfall is scanty, less than 20 inches, and is marked by a September maximum (see graph of Abashiri, Fig. 9, p. 27). Southwards temperatures become less extreme and rainfall increases. The Hakodate type includes besides southern and western Hokkaido a part of the main island (see graph of Suttsu, p. 27). The central zone is subdivided into eastern and western types primarily on a basis of seasonal distribution of rainfall. The east has a rainy season in summer, the west in winter. The west is further characterized by greater cloudiness and frequency of fog. As far as the agriculturist is concerned, the southern part of the central zone is distinguished as a two-crop region—rice in summer and wheat in winter. The southern zone is semitropical, and three crops a year can be raised. The winter temperature is low for the latitude, but the summers with high temperatures and great humidity are enervating.

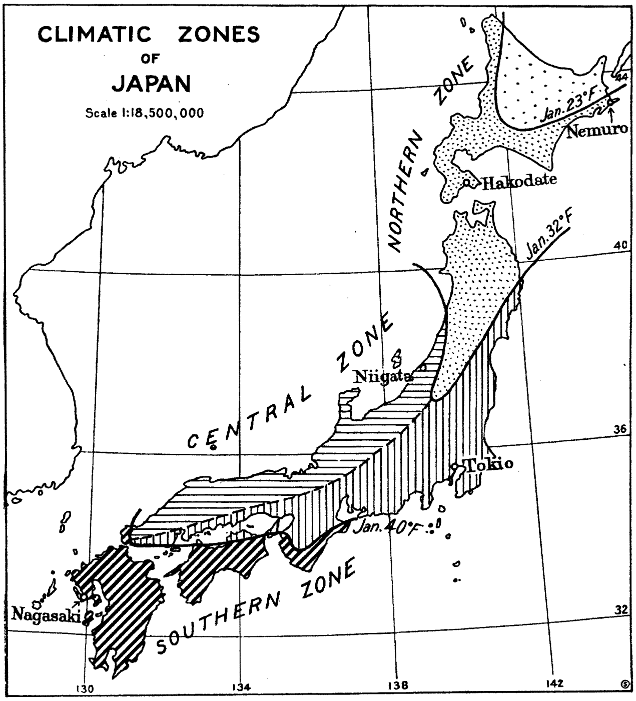

FIG. 1

Formosa on the northern tropic has a typical two-season monsoon climate. The winter monsoon brings heavy rainfall to the north and east of the island. Kashoryo on an eastern hillside has the reputation of being one of the wettest places (289 inches a year) in the Far East. The southwest monsoon brings lighter rains, but the typhoons which prevail during the summer are responsible for abnormal rainfalls.

## HISTORY OF GEOGRAPHY AND EXPLORATION

**The Farthest Points reached by Bartholomeu Dias.** The identification of places visited by early navigators has always raised difficulties. We are familiar in America with discussions about the place where Leif Eriksen built his house in Vinland or as to whether Columbus' first landfall was Watling or Cat or Great Turk or some other island. Of a similarly controversial nature is the problem of the farthest points reached by Bartholomeu Dias on the famous voyage of 1487–1488 during which he discovered the Cape of Good Hope and about which Canon E. B. Ford has set forth some new theories in a paper recently read before the South African Association for the Advancement of Science (*South African Journ. of Sci.*, March, 1920, pp. 345–364).

The commonly accepted narrative of Dias' voyage is found in De Barros' "Asia," an elaborate and pretentious, though not entirely reliable, work written some sixty years later. From a detailed study of more nearly contemporary sources—particularly certain old maps and the *roteiro*, or diary, kept during the expedition of Vasco da Gama—as well as from an extended personal examination of the ground, Canon Ford has come to the conclusion, among other things, that De Barros was mistaken in saying that the last *padrão*, or stone monument, set up by Dias, was on the island of Santa Cruz in Algoa Bay, although the navigator may well have built a wooden cross at this point. He believes that the *padrão* in question, which was dedicated to San Gregorio, was probably erected at Kwaiihoek, or False Islet, on the mainland to the east. Of greater general interest, however, is the determination of the exact point at which Dias, overcome by the objections of his officers and forced to abandon his ambitious project of pushing on to the Indies, finally put about and headed for home. Canon Ford rejects the long accepted identification of the small river which marked this point, and which was named by Dias "Rio do Infante," with the Great Fish River and favors instead the Keiskama some twenty miles farther east. The latter is at a distance which accords far better with the figure given in the *roteiro* for the stretch between the *padrao* and the Rio do Infante than does the shorter distance between the supposed position of the *padrão* and the Great Fish.

In connection with the date of Dias' voyage, Ravenstein in an article in the *Geographical Journal* for 1900 showed that De Barros was wrong when he placed it in 1486–1487 instead of 1487–1488. As the names given to places along the coast were in many instances taken from the church calendar and bestowed on the days during which the various localities were passed, it is possible for us to gain some idea of the chronology of the voyage from the maps drawn to illustrate it; and, indeed, Canon Ford suggests that "the names given by Dias are well worthy of a more extended study."

## PHYSICAL GEOGRAPHY

**The Recording of Nighttime Cloudiness.** Professor R. DeC. Ward's recent discussion of "Cloudiness in the United States" (*Geogr. Rev.*, Vol. 9, 1920, pp. 347–356), concerns daytime observations of sky cover and duration of sunshine but not nighttime cloud conditions: for practically no records of nighttime cloudiness are available. Eye observations of cloudiness are made hourly at the central office of the U. S. Weather Bureau by watchmen, and irregularly at other Weather Bureau stations. Some astronomical observatories also keep records of night cloudiness. The only automatic records of night cloudiness made in the United States are taken at Blue Hill Observatory (Harvard University) and at the University of Chicago station of the U. S. Weather Bureau. The instruments used are modified Pickering Pole-Star (photographic) recorders. The apparatus at Chicago was only recently installed (described in *Monthly Weather Rev.*, Mar., 1919, Vol. 47, pp. 154–156). A similar night cloudiness recorder has recently been brought into use at the Royal Observatory, Greenwich (described and discussed in *Quart. Journ. Royal Meteorol. Soc., July, 1920*, Vol. 46, 1920, pp. 243–244). In view of the blanketing effect of clouds on nocturnal cooling, night cloudiness is worthy of close observation, especially where there are fruits or other crops subject to frost damage.

Charles F. Brooks